

REMARKS

The Examiner's continued attention to the application is noted with appreciation.

The Examiner's notation of the proper form of the priority claim to be made in the present application is noted with appreciation and the Examiner's suggestion has been followed in the amendment to the specification made herein.

The Examiner rejected claims 1, 2, 4, and 6 under 35 U.S.C. § 102(b) as being anticipated by Uchiyama et al. ("Uchiyama"). The rejection is traversed, particularly as to the claims as amended (note that claim 6 depends from claim 5, which was rejected under § 103(a)). Uchiyama teaches a primary laser and an auxiliary laser. The primary laser operates horizontally so as to not strike the object being formed or its substrate. See col. 3, lines 13-23, and Figs. 1-4. Only the secondary laser strikes the surface of the object being formed and/or its substrate. The present invention, to the contrary, does not rely on a primary laser to melt powdered material before deposit, but rather on a plurality of relatively low-powered lasers directed to (preferably focused at) approximately a same location on the deposition substrate.

The Examiner rejected claims 5 and 7-16 under 35 U.S.C. § 103(a) as being unpatentable over Uchiyama. The rejection is traversed, particularly as to the claims as amended. The deficiencies of Uchiyama have been discussed, above. Uchiyama teaches away from use of multiple lasers directed at the substrate because Uchiyama relies on the horizontal laser for the primary powder melting capability.

The Examiner rejected claims 3 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Uchiyama in view of Schaefer et al. ("Schaefer"). Claims 3 and 11 have been directed to the focusing of the multiple laser beams at approximately a same location.

Attached hereto is a marked-up version of the changes made to the specification and/or claims by the current amendment. The attached paper is captioned "Version with Markings to Show Changes Made."

An earnest attempt has been made to respond to each and every ground of rejection advanced by the Examiner, without introduction of new matter or raising new issues. However, should the Examiner have any queries, suggestions or comments relating to a speedy disposition of the application, the Examiner is invited to call the undersigned.

Reconsideration and allowance are respectfully requested.

Respectfully submitted,

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PATENT Ser. No. 09/841,871

Version with Markings to Show Changes Made

In the Specification:

Please amend the paragraph on page 1, line 10, to read as follows:

--This application is a [division of Ser. Nr. 09/010,673, Filed 1998 January 22] divisional application of U.S. Patent Application Serial No. 09/119,317, filed on July 20, 1998, now U.S. Patent No. 6,268,584, which was a divisional application of U.S. Patent Application Serial No. 09/010,673, filed on January 22, 1998, now U.S. Patent No. 5,993,554.--

In the Claims:

Please amend the claims as follows:

1. (Twice Amended) A direct material deposition method comprising the steps of:
 - a. providing a powdered material that can be incited by a laser beam;
 - b. providing a laser nozzle assembly having multiple laser beams coupled with said powdered material from a set of powder nozzles directed to approximately a same location;
 - c. positioning a deposition substrate adjacent to laser deposition head outlets;
 - d. heating said powdered material on said deposition substrate with said laser beams; and
 - e. providing relative motion between said laser deposition head outlets and said deposition substrate.

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3. (Twice Amended) The method of Claim 1, wherein said [heating step vaporizes said powdered material, whereby the vaporized powdered material is deposited onto said deposition substrate to create a thin layer of material] step of providing a laser nozzle assembly comprises providing a laser nozzle assembly having multiple laser beams focused on approximately a same location.

9. (Amended) A direct material deposition method comprising the steps of:

- a. providing a powdered material that can be incited by a laser beam;
- b. providing a laser nozzle assembly having three or more laser beams coupled with said powdered material from a set of powder nozzles directed to approximately a same location;
- c. positioning a deposition substrate adjacent to laser deposition head outlets;
- d. heating said powdered material on said deposition substrate with said laser beams; and
- e. providing relative motion between said laser deposition head outlets and said deposition substrate.

11. (Amended) The method of Claim 9, wherein said [heating step vaporizes said powdered material, whereby the vaporized powdered material is deposited onto said deposition substrate to create a thin layer of material] step of providing a laser nozzle assembly comprises providing a laser nozzle assembly having three or more laser beams focused on approximately a same location.